

Listing of Claims:

Please make the following amendments to the specification (material to be inserted in replacement paragraphs or sections is in **bold and underline**, and material to be deleted is in ~~strikeout~~ or (if the deletion is of five or fewer consecutive characters or would be difficult to see) in double brackets [[]]). In brief, applicants have canceled claims 1-38, 75, and 76, in response to the restriction requirement.

1-38. (Canceled)

39. (Original) A method of detecting thermal infrared radiation, comprising:
providing a sample plate having a plurality of sample wells and a corresponding plurality of thermal reference regions positioned adjacent the sample wells;
providing an optical device configured preferentially to detect thermal infrared radiation;
detecting thermal infrared radiation transmitted from a sample positioned within at least one of the sample wells using the optical device;
detecting thermal infrared radiation transmitted from a thermal reference region positioned adjacent the sample well holding the sample using the optical device; and
constructing a sample signal characteristic of the thermal infrared radiation detected from the sample based on the thermal infrared radiation detected from the sample and the adjacent thermal reference region.

40. (Original) The method of claim 39, further comprising correlating the detected radiation with the progress of a chemical or physiological reaction occurring within the sample.

41. (Original) The method of claim 39, the frame being substantially rectangular, where the length of the frame ranges between about 125 mm and about 130 mm, and where the width of the frame ranges between about 80 mm and about 90 mm.

42. (Original) The method of claim 39, where the number of sample wells in the sample plate is selected from the group consisting of 96, 384, 768, 1536, 3456, and 9600.

43. (Original) The method of claim 39, where the density of sample wells in the sample plate is at least about 1 well per 81 mm².

44. (Original) The method of claim 39, where the volume of each sample well in the sample plate is less than about 500 microliters.

45. (Original) The method of claim 39, where the sample wells and the thermal reference regions are composed at least in part of different materials.

46. (Original) The method of claim 39, where the thermal reference regions have an emissivity of at least about 0.5.

47. (Original) The method of claim 39, where the thermal reference regions and associated support structure have a higher thermal mass than the sample wells and corresponding samples.

48. (Original) The method of claim 39, the sample wells having a central axis, where each thermal reference region includes an annular portion positioned about the central axis of a corresponding sample well.

49. (Original) The method of claim 48, the sample wells having a bottom, where each thermal reference region is positioned about or below the bottom of a corresponding sample well.

50. (Original) The method of claim 39, where the sample wells and corresponding thermal reference regions are separated by a gap along a line connecting each portion of the sample wells and the corresponding thermal reference regions to reduce heat transfer between the sample wells and thermal the reference regions.

51. (Original) The method of claim 39, each thermal reference region having an emissive reference surface, where the emissive reference surface includes a metal.

52. (Original) The method of claim 39, where the step of constructing a sample signal includes the step of subtracting a reference value from a corresponding measurement value, where the reference value is computed using the radiation detected from the thermal reference region, and where the measurement value is computed using the radiation detected from the sample.

53. (Original) The method of claim 52, where the step of constructing a sample signal includes the step of averaging the thermal infrared radiation detected from at least two different portions of the same sample.

54. (Original) The method of claim 52, where the step of constructing a sample signal includes the step of averaging the thermal infrared radiation detected from the same sample from at least two different times.

55. (Original) The method of claim 39, further comprising processing the sample signal to reduce the proportion of the sample signal that is attributable to noise.

56. (Original) The method of claim 55, where the step of processing the sample signal includes the step of computing a quantity based on distinguishable components of the sample signal representing thermal infrared radiation detected from the same sample at different times.

57. (Original) The method of claim 55, where the step of processing the sample signal includes the step of computing a quantity based on distinguishable components of the sample signal representing thermal infrared radiation detected from different portions of the same sample.

58. (Original) The method of claim 39, further comprising performing the steps of detecting thermal infrared radiation from a sample and an adjacent thermal reference region for a plurality of samples positioned in a corresponding plurality of sample wells in the sample plate.

59. (Original) The method of claim 58, further comprising:
repeating the step of constructing a sample signal for the plurality of samples;
and
adjusting the sample signals so that each has the same preselected value at the same preselected relative time.

60. (Original) The method of claim 59, where the preselected value is zero.

61. (Original) The method of claim 59, where the preselected time is zero.

62. (Original) The method of claim 58, where the thermal infrared radiation is detected simultaneously from the plurality of samples.

63. (Original) The method of claim 58, where the thermal infrared radiation is detected sequentially from the plurality of samples.

64. (Original) The method of claim 39, the sample plate comprising an insert portion containing the sample wells and a support portion containing the thermal reference regions, further comprising forming the sample plate by mating the insert portion with the support portion.

65. (Original) The method of claim 39, where the optical device comprises:
an examination site; and
a detector configured to receive and preferentially to detect thermal infrared radiation transmitted from a sample positioned within a sample well at the examination site.

66. (Original) The method of claim 39, the sample wells having a central axis, the optical device having an optical axis, further comprising aligning the central axis and the optical axis prior to the steps of detecting thermal infrared radiation.

67. (Original) The method of claim 39, further comprising shielding the sample from incident radiation to reduce the proportion of the sample signal arising from transmission, reflection, and/or photoluminescence from the sample.

68. (Original) The method of claim 39, further comprising filtering the radiation transmitted from the sample to extract thermal infrared radiation prior to the step of detecting thermal infrared radiation.

69. (Original) The method of claim 39, where at least about half of the thermal infrared radiation detected by the optical device has a wavelength between about 3 micrometers and about 5 micrometers.

70. (Original) The method of claim 39, where at least about half of the thermal infrared radiation detected by the optical device has a wavelength between about 7 micrometers and about 14 micrometers.

71. (Original) The method of claim 39, further comprising computing a quantity related to a characteristic of the thermal infrared radiation transmitted from the sample.

72. (Original) The method of claim 71, where the quantity is representative of the temperature of the sample.

73. (Original) The method of claim 71, further comprising:
computing the quantity for a plurality of samples; and
displaying the quantities graphically in a manner representative of the arrangement of the corresponding sample wells in the sample plate.

74. (Original) The method of claim 39, further comprising covering the sample wells to reduce evaporation from the samples.

75-76. (Canceled)